SEQUENCE LISTING

<110> Griffith, Irwin J
Kuo, Mei-Chang
Luqman, Mohammad

<120> T CELL EPITOPES OF RYEGRASS POLLEN ALLERGEN

<130> IMI-040CP3

<140> 08/737,904
<141> 1996-11-20

<150> 08/106,016
<151> 1993-08-13

<160> 62

<170> PatentIn Ver. 2.0

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Tyr Thr Val Ala Leu Phe Leu Ala Val Ala Leu Val Ala Gly Pro Ala
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gcc tcc tac gcc gct gac gcc ggc tac acc ccc gca gcc gcg gcc acc 150
Ala Ser Tyr Ala Ala Asp Ala Gly Tyr Thr Pro Ala Ala Ala Ala Thr
1 5 10

ccg gct act cct gct gcc acc ccg gct gcg gct gga ggg aag gcg acg 198
Pro Ala Thr Pro Ala Ala Thr Pro Ala Ala Ala Gly Gly Lys Ala Thr
15 20 25

acc gac gag cag aag ctg ctg gag gac gtc aac gct ggc ttc aag gca 246
Thr Asp Glu Gln Lys Leu Leu Glu Asp Val Asn Ala Gly Phe Lys Ala
30 35 40

gcc gtg gcc gcc gct gcc aac gcc cct ccg gcg gac aag ttc aag atc 294
Ala Val Ala Ala Ala Ala Asn Ala Pro Pro Ala Asp Lys Phe Lys Ile
45 50 55 60

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Phe Glu Ala Ala Phe Ser Glu Ser Ser Lys Gly Leu Leu Ala Thr Ser
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Ala Ala Lys Ala Pro Gly Leu Ile Pro Lys Leu Asp Thr Ala Tyr Asp
            80                  85                  90

gtc gcc tac aag gcc gcc gag ggc gcc acc ccc gag gcc aag tac gac   438
Val Ala Tyr Lys Ala Ala Glu Gly Ala Thr Pro Glu Ala Lys Tyr Asp
        95                  100                 105

gcc ttc gtc act gcc ctc acc gaa gcg ctc cgc gtc atc gcc ggc gcc   486
Ala Phe Val Thr Ala Leu Thr Glu Ala Leu Arg Val Ile Ala Gly Ala
    110                 115                 120

ctc gag gtc cac gcc gtc aag ccc gcc acc gag gag gtc cct gct gct   534
Leu Glu Val His Ala Val Lys Pro Ala Thr Glu Glu Val Pro Ala Ala
125                 130                 135                 140

aag atc ccc acc ggt gag ctg cag atc gtt gac aag atc gat gct gcc   582
Lys Ile Pro Thr Gly Glu Leu Gln Ile Val Asp Lys Ile Asp Ala Ala
                145                 150                 155

ttc aag atc gca gcc acc gcc gcc aac gcc gcc ccc acc aac gat aag   630
Phe Lys Ile Ala Ala Thr Ala Ala Asn Ala Ala Pro Thr Asn Asp Lys
            160                 165                 170

ttc acc gtc ttc gag agt gcc ttc aac aag gcc ctc aat gag tgc acg   678
Phe Thr Val Phe Glu Ser Ala Phe Asn Lys Ala Leu Asn Glu Cys Thr
        175                 180                 185

ggc ggc gcc tat gag acc tac aag ttc atc ccc tcc ctc gag gcc gcg   726
Gly Gly Ala Tyr Glu Thr Tyr Lys Phe Ile Pro Ser Leu Glu Ala Ala
    190                 195                 200

gtc aag cag gcc tac gcc gcc acc gtc gcc gcc gcg ccc gag gtc aag   774
Val Lys Gln Ala Tyr Ala Ala Thr Val Ala Ala Ala Pro Glu Val Lys
205                 210                 215                 220

tac gcc gtc ttt gag gcc gcg ctg acc aag gcc atc acc gcc atg acc   822
Tyr Ala Val Phe Glu Ala Ala Leu Thr Lys Ala Ile Thr Ala Met Thr
                225                 230                 235

cag gca cag aag gcc ggc aaa ccc gct gcc gcc gct gcc aca ggc gcc   870
Gln Ala Gln Lys Ala Gly Lys Pro Ala Ala Ala Ala Ala Thr Gly Ala
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gca acc gtt gcc acc ggc gcc gca acc gcc gcc gcc ggt gct gcc acc   918
Ala Thr Val Ala Thr Gly Ala Ala Thr Ala Ala Ala Gly Ala Ala Thr
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Ala Ala Ala Gly Gly Tyr Lys Ala
    270                 275

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Ala Ala Ala Ala Thr Pro Ala Thr Pro Ala Ala Thr Pro Ala Ala Ala
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Gly Gly Lys Ala Thr Thr Asp Glu Gln Lys Leu Leu Glu Asp Val Asn
    25                  30                  35
Ala Gly Phe Lys Ala Ala Val Ala Ala Ala Ala Asn Ala Pro Pro Ala
40                  45                  50                  55
Asp Lys Phe Lys Ile Phe Glu Ala Ala Phe Ser Glu Ser Ser Lys Gly
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Leu Leu Ala Thr Ser Ala Ala Lys Ala Pro Gly Leu Ile Pro Lys Leu
            75                  80                  85
Asp Thr Ala Tyr Asp Val Ala Tyr Lys Ala Ala Glu Gly Ala Thr Pro
        90                  95                  100
Glu Ala Lys Tyr Asp Ala Phe Val Thr Ala Leu Thr Glu Ala Leu Arg
    105                 110                 115
Val Ile Ala Gly Ala Leu Glu Val His Ala Val Lys Pro Ala Thr Glu
120                 125                 130                 135
Glu Val Pro Ala Ala Lys Ile Pro Thr Gly Glu Leu Gln Ile Val Asp
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Lys Ile Asp Ala Ala Phe Lys Ile Ala Ala Thr Ala Ala Asn Ala Ala
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Pro Thr Asn Asp Lys Phe Thr Val Phe Glu Ser Ala Phe Asn Lys Ala
        170                 175                 180
Leu Asn Glu Cys Thr Gly Gly Ala Tyr Glu Thr Tyr Lys Phe Ile Pro
    185                 190                 195
Ser Leu Glu Ala Ala Val Lys Gln Ala Tyr Ala Ala Thr Val Ala Ala
200                 205                 210                 215
Ala Pro Glu Val Lys Tyr Ala Val Phe Glu Ala Ala Leu Thr Lys Ala
                220                 225                 230
Ile Thr Ala Met Thr Gln Ala Gln Lys Ala Gly Lys Pro Ala Ala Ala
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<213> Lolium perenne

<220>

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1 5 10 15

Asp Val Asn Ala
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Ala Ala Ala Ala
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Gly Phe Lys Ala Ala Val Ala Ala Ala Ala Asn Ala Pro Pro Ala Asp
1 5 10 15

Lys Phe Lys Ile
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<210> 8
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Glu Ser Ser Lys
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Ala Ala Lys Ala
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Leu Asp Thr Ala
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<210> 11
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Tyr Asp Ala Phe
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Val His Ala Val
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Val Pro Ala Ala
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<210> 16
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Phe Lys Ile Ala
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<210> 18
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Glu Ser Ala Phe

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Cys Thr Gly Gly
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<400> 21
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Phe Ile Pro Ser
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<210> 22
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Gln Ala Tyr Ala
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<210> 23
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Pro Glu Val Lys
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1 5 10 15

Ala Leu Thr Lys
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Tyr Ala Val Phe Glu Ala Ala Leu Thr Lys Ala Ile Thr Ala Met Thr
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Gln Ala Gln Lys
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<400> 26
Ala Ile Thr Ala Met Thr Gln Ala Gln Lys Ala Gly Lys Pro Ala Ala
1 5 10 15

Ala Ala Ala Thr
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<210> 27
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Thr Gly Ala Ala
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<400> 28
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1 5 10 15

Ala Thr Ala Ala
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<210> 30
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Ile Ala Lys Val Pro Pro Gly Pro Asn Ile Thr Ala Glu Tyr Gly Asp
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Lys Trp Leu Asp
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<223> Xaa = hydroxyproline

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Lys Trp Leu Asp
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Gly Lys Pro Thr
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<210> 33
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Gly Ala Gly Pro Lys Asp Asn Gly Gly Ala Cys Gly Tyr Lys Asn Val
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Asp Lys Ala Pro
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<400> 34
Gly Ala Gly Pro Lys Asp Asn Gly Gly Ala Cys Gly Tyr Lys Asp Val
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Asp Lys Ala Pro
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Cys Gly Asn Thr
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<210> 36
<211> 20
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<213> Lolium perenne

<400> 36
Phe Asn Gly Met Thr Gly Cys Gly Asn Thr Pro Ile Phe Lys Asp Gly
1 5 10 15

Arg Gly Cys Gly
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<210> 37
<211> 20
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Pro Ile Phe Lys Asp Gly Arg Gly Cys Gly Ser Cys Phe Glu Ile Lys
1 5 10 15

Cys Thr Lys Pro
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<210> 38
<211> 20
<212> PRT
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<400> 38
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Ala Val Thr Val
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<210> 39
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Glu Ser Cys Ser Gly Glu Ala Val Thr Val Thr Ile Thr Asp Asp Asn
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Glu Glu Pro Ile
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Leu Ser Gly His
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<210> 41
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Ala Pro Tyr His Phe Asp Leu Ser Gly His Ala Phe Gly Ser Met Ala
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Asp Asp Gly Glu
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Ala Gly Glu Leu
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<210> 43
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Glu Gln Lys Leu Arg Ser Ala Gly Glu Leu Glu Leu Gln Phe Arg Arg
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Val Lys Cys Lys
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<210> 44
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Glu Leu Gln Phe Arg Arg Val Lys Cys Lys Tyr Pro Asp Asp Thr Lys
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Pro Thr Phe His
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<210> 45
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Pro Asn Tyr Leu
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<210> 46
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Val Glu Lys Ala Ser Asn Pro Asn Tyr Leu Ala Ile Leu Val Lys Tyr
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Val Asp Gly Asp
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Asp Ile Lys Glu
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Ile Glu Leu Lys
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Trp Arg Ile Asp
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Gly Gly Thr Lys
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Ile Pro Glu Gly
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Tyr Ser Ala Lys
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Lys

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Asn Gly Gly Ala
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1 5 10 15

Gly Pro Phe Thr
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Val Gln Gln Tyr Thr Val Ala Leu Phe Leu Ala Val Ala Ser Cys Arg
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Ala Arg Ala Ser Tyr Ala Ala Asp Ala Gly Tyr Ala Pro Ala Thr Pro
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Ala Thr Pro Ala Thr Pro Ala Ala Pro Gly Ala Ala Val Pro Ala Gly
15 20 25

aag gcg gcg acc gag gag cag aag ctg atc gag aag atc aac gcc ggc 250
Lys Ala Ala Thr Glu Glu Gln Lys Leu Ile Glu Lys Ile Asn Ala Gly
30 35 40

ttc aag gcc gcc gtg gcg gcc gcc gcg ggc gtc ccg cca ggc gac aag 298
Phe Lys Ala Ala Val Ala Ala Ala Ala Gly Val Pro Pro Gly Asp Lys

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Tyr Lys Thr Phe Val Glu Thr Phe Gly Lys Ala Ser Asn Lys Ala Phe
     60                  65                  70

ctg ggg gac ctc ccg acc aac tac gcc gat gtc aac tcc agg gcc cag   394
Leu Gly Asp Leu Pro Thr Asn Tyr Ala Asp Val Asn Ser Arg Ala Gln
 75                  80                  85                  90

ctc acc tcg aag ctc gac gcc gcc tac aag ctc gcc tac gac gcc gcc   442
Leu Thr Ser Lys Leu Asp Ala Ala Tyr Lys Leu Ala Tyr Asp Ala Ala
                 95                 100                 105

cag ggc gcc acc ccc gag gcc aag tac gac gcc tac gtc gcc acc ctc   490
Gln Gly Ala Thr Pro Glu Ala Lys Tyr Asp Ala Tyr Val Ala Thr Leu
            110                 115                 120

agc gag gcg ctc cgc atc atc gcc ggc acc ctc gag gtc cac gcc gtc   538
Ser Glu Ala Leu Arg Ile Ile Ala Gly Thr Leu Glu Val His Ala Val
        125                 130                 135

aag ccc gct gcc gag gag gtc aag cct atc ccc gcc gga gag ctg cag   586
Lys Pro Ala Ala Glu Glu Val Lys Pro Ile Pro Ala Gly Glu Leu Gln
    140                 145                 150

atc gtc gac aag att gac gtc gcc ttc aga act gcc gcc acc gcc gcc   634
Ile Val Asp Lys Ile Asp Val Ala Phe Arg Thr Ala Ala Thr Ala Ala
155                 160                 165                 170

aac gcc gcc ccc acc aac gac aag ttc acc gta ttc gag acc acc ttt   682
Asn Ala Ala Pro Thr Asn Asp Lys Phe Thr Val Phe Glu Thr Thr Phe
                175                 180                 185

aac aag gcc atc aag gag agc acg ggc ggc acc tac gag agc tac aag   730
Asn Lys Ala Ile Lys Glu Ser Thr Gly Gly Thr Tyr Glu Ser Tyr Lys
            190                 195                 200

ttc att ccc acc ctt gag gcc gcc gtt aag cag gcc tac gcc gcc acc   778
Phe Ile Pro Thr Leu Glu Ala Ala Val Lys Gln Ala Tyr Ala Ala Thr
        205                 210                 215

gtc gca tcc gcg ccg gag gtc aag tac gcc gtc ttt gag acc gcg ctg   826
Val Ala Ser Ala Pro Glu Val Lys Tyr Ala Val Phe Glu Thr Ala Leu
    220                 225                 230

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Lys Lys Ala Val Thr Ala Met Ser Glu Ala Gln Lys Glu Ala Lys Pro
235                 240                 245                 250

gcc acc gcc acc ccg acc ccc acc gca act gcc gcg gcc gcg gtg gcc   922
Ala Thr Ala Thr Pro Thr Pro Thr Ala Thr Ala Ala Ala Ala Val Ala
                255                 260                 265

acc aac gcc gcc ccc gtc gct gct ggt ggc tac aaa atc tgatcaactc    971
Thr Asn Ala Ala Pro Val Ala Ala Gly Gly Tyr Lys Ile
            270                 275

gctagcaata tacacatcca tcatgcacat atagagctgt gtatgtatgt gcatgcatgc 1031

cgtggcgccg cgcaagtttg ctcataatta attcttggtt ttcgttgctt gcatccacga 1091
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taatatataa ttgagtacta aaaaaaaaaa 1181

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<213> Lolium perenne

<400> 58

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Cys Arg Ala Arg Ala Ser Tyr Ala Ala Asp Ala Gly Tyr Ala Pro Ala
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Thr Pro Ala Thr Pro Ala Thr Pro Ala Ala Pro Gly Ala Ala Val Pro
     10                  15                  20

Ala Gly Lys Ala Ala Thr Glu Glu Gln Lys Leu Ile Glu Lys Ile Asn
 25                  30                  35                  40

Ala Gly Phe Lys Ala Ala Val Ala Ala Ala Ala Gly Val Pro Pro Gly
                45                  50                  55

Asp Lys Tyr Lys Thr Phe Val Glu Thr Phe Gly Lys Ala Ser Asn Lys
            60                  65                  70

Ala Phe Leu Gly Asp Leu Pro Thr Asn Tyr Ala Asp Val Asn Ser Arg
         75                  80                  85

Ala Gln Leu Thr Ser Lys Leu Asp Ala Ala Tyr Lys Leu Ala Tyr Asp
     90                  95                  100

Ala Ala Gln Gly Ala Thr Pro Glu Ala Lys Tyr Asp Ala Tyr Val Ala
105                 110                 115                 120

Thr Leu Ser Glu Ala Leu Arg Ile Ile Ala Gly Thr Leu Glu Val His
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Ala Val Lys Pro Ala Ala Glu Glu Val Lys Pro Ile Pro Ala Gly Glu
            140                 145                 150

Leu Gln Ile Val Asp Lys Ile Asp Val Ala Phe Arg Thr Ala Ala Thr
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Ala Ala Asn Ala Ala Pro Thr Asn Asp Lys Phe Thr Val Phe Glu Thr
    170                 175                 180

Thr Phe Asn Lys Ala Ile Lys Glu Ser Thr Gly Gly Thr Tyr Glu Ser
185                 190                 195                 200

Tyr Lys Phe Ile Pro Thr Leu Glu Ala Ala Val Lys Gln Ala Tyr Ala
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Ala Thr Val Ala Ser Ala Pro Glu Val Lys Tyr Ala Val Phe Glu Thr
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Ala Leu Lys Lys Ala Val Thr Ala Met Ser Glu Ala Gln Lys Glu Ala
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